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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/751,390	01/05/2004	Johannes Kaeppler	03345-P0046A	2672

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EXAMINER
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MACARTHUR, SYLVIA

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 07/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/751,390	<b>Applicant(s)</b> KAEPELER, JOHANNES	
	<b>Examiner</b> Sylvia R. MacArthur	<b>Art Unit</b> 1763	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 April 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Priority***

1. Applicant is advised of possible benefits under 35 U.S.C. 119(a)-(d), wherein an application for patent filed in the United States may be entitled to the benefit of the filing date of a prior application filed in a foreign country.
2. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Germany on 07/4/2001. It is noted, however, that applicant has not filed a certified copy of the German application as required by 35 U.S.C. 119(b).

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Germany on 4/22/2002. It is noted, however, that applicant has not filed a certified copy of the PCT application as required by 35 U.S.C. 119(b).

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Lum et al (EP 0519608) as evidenced by an excerpt from [www.physlink.com](http://www.physlink.com).

Regarding claim 1: Lum et al teaches a substrate holder of thermally anisotropic material used for enhancing uniformity of grown epitaxial layers. Lum teaches having a HF heated substrate holder 12 made of conductive material (graphite) for holding the

substrate. The holder further comprises a zone 20, made of pyrolytic graphite or pyrolytic BN, see abstract and col.3 lines 37-58. Also col.4 lines 7-21 recites that the pyrolytic materials have a higher thermal conductivity. The thermal conductivity and electrical conductivity are directly proportional to one another as evidenced by the excerpt from [www.physlink.com](http://www.physlink.com).

Regarding claim 2: Note that the zone 20 refers to an area taken up by the substrate, see Figs. 5 and 10.

Regarding claim 3: The insert piece 20 consists of coated graphite, see abstract.

5. Claims 1,2,4-7,10,11, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Wollam (US 3,783,822).

Wollam teaches an apparatus for use in deposition of films from a vapor phase.

Regarding claim 1: Wollam teaches having an RF (a form of high frequency) heated substrate holder (disc 60) made of a conductive material (graphite) for holding the substrate. The holder further comprises a zone 102 (disc-shaped protuberance made of a higher thermal conductivity), see Fig. 6. The thermal conductivity and electrical conductivity are directly proportional to one another as evidenced by the excerpt from [www.physlink.com](http://www.physlink.com).

Regarding claim 2: Note that the zone 102 refers to an area taken up by the substrate 107, see Fig. 6.

Regarding claim 4: The holder of Wollam further includes substrate bearing disks 60-66 and disks 7-10, mounted on gas bearing 135/137 and each having an associated insert piece.

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Regarding claim 5: The disks 6-10 consist of metal, specifically graphite according to col. 4 lines 20-56.

Regarding claim 6: Figs. 5 and 7 illustrate that the disks are disposed in a planetary fashion.

Regarding claim 7: Located in substrate bearing disk is located a gas bearing in a bearing recess, see Fig. 6

Regarding claim 10: Col. 4 lines 20-55 teaches that the rf coil is below the substrate holder.

Regarding claim 11: The reactor is a cold-wall reactor according to Fig. 8 the reactor is heated by the radiant heating of the holder.

Regarding claim 13: Gas enters the reactor via pipe 94 according to col. 7 lines 29-34.

6. Claims 1-3 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Gurary et al (US 6,368,404).

Regarding claim 1: Gurary et al teaches an induction heated CVD reactor.

Gurary et al teaches having a HF heated substrate holder (susceptor) 122 made of conductive material for holding the substrate 134. The holder further comprises a zone 130 (graphite with a SiC coating), see abstract and col. 5 lines 1-54.

Regarding claim 2: Note that the zone 130 refers to an area taken up by the substrate, see Figs. 2 and 3.

Regarding claim 3: The insert piece 130 consists of coated graphite, see col.6 lines 43-54.

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Regarding claim 8: A susceptor constructed of molybdenum is discussed in col. 6 lines 50-55.

*Claim Rejections - 35 USC § 103*

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wollam.

The teachings of Wollam are discussed above.

Wollam fails teach that the inset piece is constructed of coated graphite. Wollam does teach the use of coated graphite as a material to construct the reactor at hi temperature ranges as those in col.4 lines 57-68. The motivation to utilize this material is cited by Wollam as these material are inert to process gases and do not produce undesirable gases/vapors. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the holder of coated graphite.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wollam in view of Gurary et al.

The teachings of Wollam were discussed above. Wollam fails to teach a holder made of the materials listed in claim 8.

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The teachings of Gurary et al were discussed above. Namely, Gurary et al teaches a susceptor constructed of molybdenum is discussed in col. 6 lines 50-55. This citation teaches that molybdenum is a known suitable material of construction of holders especially when processing a high temperatures. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide molybdenum as the material to construct the holder of Wollam.

10. Claim 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wollam in view of Kaeppler et al.

The teachings of Wollam were discussed above.

Wollam fails to teach--

Regarding claim 9: Wollam et al fails to teach a holder surrounded by an HF coil.

Kaeppler et al teaches a CVD reactor with a graphite foam susceptor.

The holder is surrounded by coil 13. The motivation to substitute the holder of Kaeppler et al for the holder of Wollam is that the holder of Kaeppler et al provides more uniform heating of the reactor and the substrate with improved insulation, see the abstract. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to substitute the holding apparatus of Kaeppler et al for the holder of Wollam et al.

Regarding claim 12: Wollam et al fails to teach a tube reactor. Kaeppler et al teaches a graphite tube 1. The motivation to use the tube as basis of geometric design for the reactor of Wollam et al is that the tube provides for a better insulation over the substrate than the conventional reactors due to the formation a sleeve with this geometry. Thus, it

would have been obvious for one of ordinary skill in the art at the claimed invention to provide the reactor of Wollam in the form of a tube as taught by Kaeppler et al.

11. Claim 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rupp (US 6,740,167).

Rupp teaches a susceptor 1 made of graphite with an insert made of SiC, see the paragraph joining cols. 4 and 5. Rupp further teaches that the material of the insert must be able to withstand high temperatures, a property synonymous with electrical conductivity. In col.5 lines 3-16 Rupp further teaches other materials that can be used such as Ta, Nb, N, W, etc. The motivation to design the multiple holder/insert susceptor of Rupp with the difference between the susceptor and insert based on material of differing electrical conductivity is that each holder in Rupp holds a wafer separately from another wafer and can be used to process different types of wafers and process the wafers with different processing temperatures as an different insert allows for the wafers to be heated differently. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct a multi-holder with each holder having an insert piece made of a different material of construction wherein each material differs basis the electrical conductivity so that the wafers can be heated a different rates and magnitudes.

12. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lum. The teachings of Lum were discussed above, namely a susceptor with a holder made of graphite having the surface that is contacted by the wafer made of a material with a higher electrical/thermal conductivity (pyrolytic (coated) graphite).



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Lum fails to teach a susceptor with a plurality of holder having respective insert pieces.

The motivation to provide a plurality of holders having respective insert pieces is that the holder would provide an increased throughput allowing more wafers to be processed at a time. The mere duplication of parts was held to have been obvious and has no patentable significance unless a new and unexpected result is produced according to *In re Harza*, 274 F 2d 669, 124 USPQ 378 (CCPA 196).

Lum further teaches pyrolytic BN or pyrolytic graphite as materials of construction for the insert pieces. The material of construction of susceptor and insert pieces are matters of optimization. The motivation to design the multiple holder/insert susceptor of Rupp with the difference between the susceptor and insert based on material of differing electrical conductivity is that each holder in Lum holds a wafer separately from another wafer and can be used to process different types of wafers and process the wafers with different processing temperatures as an different insert allows for the wafers to be heated differently. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct a multi-holder with each holder having an insert piece made of a different material of construction wherein each material differs basis the electrical conductivity so that the wafers can be heated a different rates and magnitudes.

13. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lum in view of Rupp.

The teachings of Lum were discussed above. Lum fails to teach the materials as recited by claim 17. In col.5 lines 3-16 Rupp teaches materials that can be used such as Ta, Mb,

N, W, etc. These materials possess a different electric conductivity a physical property that is related to how well a material withstands high temperature. The motivation to design the multiple holder/insert susceptor of Rupp with the difference between the susceptor and insert based on material of differing electrical conductivity is that each holder in Rupp holds a wafer separately from another wafer and can be used to process different types of wafers and process the wafers with different processing temperatures as an different insert allows for the wafers to be heated differently. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct a multi-holder with each holder having an insert piece made of a different material of construction wherein each material differs basis the electrical conductivity so that the wafers can be heated a different rates and magnitudes.

### ***Response to Arguments***

14. Applicant's arguments filed 4/5/2006 have been fully considered but they are not persuasive. Each of the prior art discussed above teaches or fairly suggest a susbstrate holder with insert pieces. The material of construction of the holder and insert pieces are different basis thermal conductivity which is directly proportional to and often synonymously referred to an electrical conductivity or in layman's terms can withstand high temperatures as evidenced by [www.physlink.com](http://www.physlink.com)

### ***Conclusion***

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15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action, namely new claims 14-17 led to the introduction of the prior art by Rupp and the 103 rejection of Lum. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

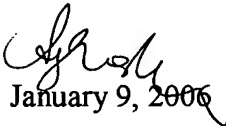
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-F during the hours of 8:30 a.m. and 5 p.m.

17. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
January 9, 2006

Sylvia R MacArthur  
Patent Examiner  
Art Unit 1763

  
**PARVIZ HASSANZADEH**  
**SUPERVISORY PATENT EXAMINER**